

WHAT IS CLAIMED IS:

Sub A 1. An electrooptical device including a semiconductor device having a pixel portion and a driver circuit portion on the same insulator,

5 wherein an active layer of a pixel TFT formed in said pixel portion has a low concentration impurity region, a channel forming region, and a high concentration impurity region which are formed between a source region and a drain region,

10 wherein said channel forming region and said high concentration impurity region are formed under a gate electrode, and

15 wherein said low concentration impurity region partially overlaps with said gate electrode with a gate insulating film interposed therebetween.

2. An electrooptical device according to claim 1, wherein said low concentration impurity region contains an element that belongs to group XV in the periodic table at a concentration of 2×10^{16} to 5×10^{19} atoms/cm³, and said high concentration impurity region contains the element at a concentration of 5×10^{19} to 3×10^{21} atoms/cm³.

3. An electrooptical device according to claim 1, wherein a thickness of the gate insulating film of a TFT in said driver circuit portion is thinner than that of the gate insulating film of the pixel TFT.

20 4. An electrooptical device according to claim 1, wherein the gate insulating film of a TFT in said driver circuit portion and a dielectric of a storage capacitor formed in said pixel portion comprise the same material and have the same film thickness.

5. An electronic equipment comprising as a display unit an electrooptical device according to claim 1.

6. An electrooptical device including a semiconductor device having a pixel portion and a driver circuit portion on the same insulator,

5 wherein an active layer of a pixel TFT formed in said pixel portion has a low concentration impurity region, a channel forming region, and a high concentration impurity region which are formed between a source region and a drain region,

10 wherein said channel forming region and said high concentration impurity region are formed under a gate electrode, and

15 wherein said low concentration impurity region has a region that overlaps with said gate electrode with a gate insulating film interposed therebetween, and a region that does not overlap with the gate electrode.

7. An electrooptical device according to claim 6, wherein said low concentration impurity region contains an element that belongs to group XV in the periodic table at a concentration of 2×10^{16} to 5×10^{19} atoms/cm³, and said high concentration impurity region contains the element at a concentration of 5×10^{19} to 3×10^{21} atoms/cm³.

20 8. An electrooptical device according to claim 6, wherein a thickness of the gate insulating film of a TFT in said driver circuit portion is thinner than that of the gate insulating film of the pixel TFT.

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9. An electrooptical device according to claim 6, wherein the gate insulating film of a TFT in said driver circuit portion and a dielectric of a storage capacitor formed in said pixel portion comprise the same material and have the same film thickness.

5 10. An electronic equipment comprising as a display unit an electrooptical device according to claim 6.

10 11. A method of manufacturing an electrooptical device, comprising the steps of:

15 forming a semiconductor layer on an insulator;

doping a part of said semiconductor layer with an element that belongs to group XV in the periodic table to form a low concentration impurity region;

doping a part of said semiconductor layer with the element that belongs to group XV in the periodic table at a concentration higher than said low concentration impurity region to form a high concentration impurity region;

20 forming an insulating film on said semiconductor layer; and

forming a gate electrode and a capacitor electrode on said insulating film, wherein said high concentration impurity region is formed below said gate electrode and below said capacitor electrode.

25 12. A method according to claim 11, wherein said low concentration impurity region is doped with an element that belongs to group XV in the periodic table in a concentration of 2×10^{16} to 5×10^{19} atoms/cm³, and said high concentration impurity region is doped with the element in a concentration of 5×10^{19} to 3×10^{21} atoms/cm³.

13. A method of manufacturing an electrooptical device including a semiconductor device having a pixel portion comprising a plurality of pixels each having a pixel TFT and a storage capacitor, said method comprising the steps of:

forming a semiconductor layer on an insulator;

5 doping a part of said semiconductor layer with an element that belongs to group XV in the periodic table to form a low concentration impurity region;

doping a part of said semiconductor layer with the element that belongs to group XV in the periodic table in a concentration higher than said low concentration impurity region to form a high concentration impurity region;

10 forming a first insulating film on said semiconductor layer;

removing said first insulating film from a region to be said storage capacitor;

15 forming a second insulating film on the semiconductor layer exposed in the fifth step, said second insulating film having a thickness thinner than the first insulating film; and

forming a gate electrode on said first insulating film, and forming at the same time a capacitor electrode on said second insulating film,

wherein said high concentration impurity region is formed below said gate electrode and below said capacitor electrode.

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14. A method according to claim 13, wherein said low concentration impurity region is doped with an element that belongs to group XV in the periodic table in a concentration of 2×10^{16} to 5×10^{19} atoms/cm³, and said high concentration impurity region is doped with the element in a concentration of 5×10^{19} to 3×10^{21} atoms/cm³.

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